

# Hand-Assisted Laparoscopic Surgery for a Mesenteric Teratoma

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## ABSTRACT

Mature cystic teratomas are benign neoplasms of germ cell tumors that occur most frequently in gonadal sites. The tumors usually contain 2 or 3 well-differentiated elements of endodermal, ectodermal, and mesodermal origin. Although relatively uncommon, teratomas can be composed of mature tissue originating from only 1 germ cell layer. This is known as a monodermal teratoma.

Extragenital teratomas, especially mesenteric teratomas, are extremely rare. Currently, only 21 cases of mesenteric teratoma have been described in the English literature. Mesenteric teratomas are rarely diagnosed preoperatively because pathological examination is necessary to make a definitive diagnosis.

We herein report a rare case of mesenteric monodermal teratoma and review the literature. To the best of our knowledge, this is the first case of mesenteric teratoma treated with hand-assisted laparoscopic surgery.

**Key Words:** Hand-assisted laparoscopic surgery, Laparoscopy, Mature cystic teratoma, Mesenteric cyst, Ovarian cyst.

## INTRODUCTION

Mesenteric cysts are rare abdominal tumors, with a reported incidence of 1 of 27 000 to 1 of 100 000 admissions.<sup>1</sup> Mesenteric cysts are classified into 6 groups based on their clinical and histopathological features. Previously, only 21 cases of mesenteric teratoma have been described in the English literature. Although mesenteric teratomas can be treated with either laparotomy or conventional laparoscopic surgery, there are no cases of such rare tumors being treated with hand-assisted laparoscopic surgery (HALS). We herein report a rare case of mesenteric monodermal teratoma that was successfully treated with hand-assisted laparoscopic resection of the ileum.

## CASE DESCRIPTION

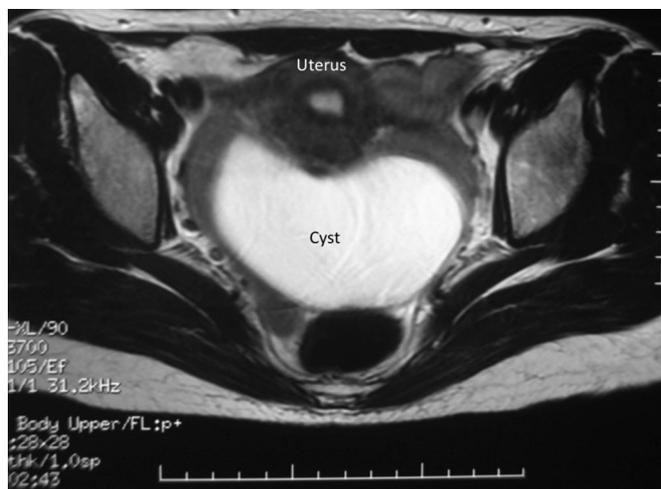
A 30-year-old woman (gravida 0, para 0, body mass index: 19.2 kg/m<sup>2</sup>) presented with chronic pain in the lower abdomen and was hospitalized for investigation and treatment. A transvaginal ultrasound showed a large cystic mass posterior to the uterus. Magnetic resonance imaging revealed a monolocular pelvic cyst measuring approximately 10 × 8 × 8 cm (**Figure 1**). There were no clinical findings possibly suggestive of malignancy such as solid component, wall thickness, and necrosis with the tumor. Magnetic resonance imaging did not visualize the left ovary. The serum cancer antigen 125 level was 61.5 U/mL (standard value: <35 U/mL). The serum l-lactate dehydrogenase, carcinoembryonic antigen, and cancer antigen 19-9 levels were within the normal limits. The differential diagnosis included serous cystadenoma or mucinous cystadenoma of the left ovary. The patient underwent laparoscopic surgery. She was placed in the lithotomy position under general anesthesia, and a pneumoperitoneum of 10 mm Hg was established using the closed method. The surgeon stood on the left side of the patient and created a 2.5-cm incision at the umbilical base. The surgeon then proceeded to expose the rectus fascia and placed 3 trocars (each 5 mm in diameter) in the fascia. An assistant surgeon stood on the right side of the patient, inserted a 5-mm rigid scope with a 30° angle through the 5-mm umbilical port, and manipulated the scope with the left hand to secure the view during surgery. During the laparoscopic surgery,

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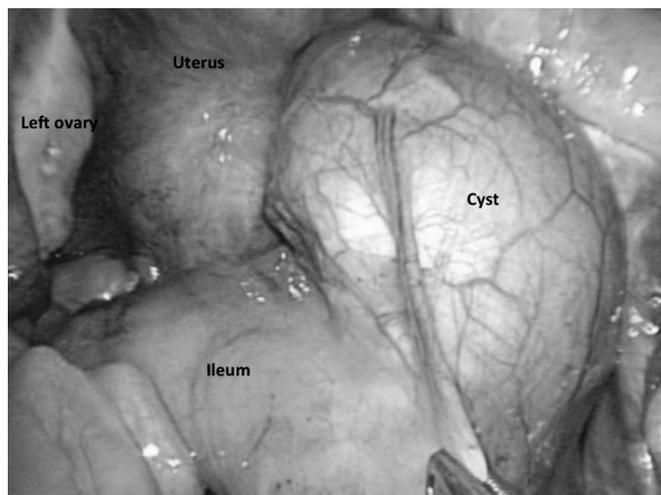
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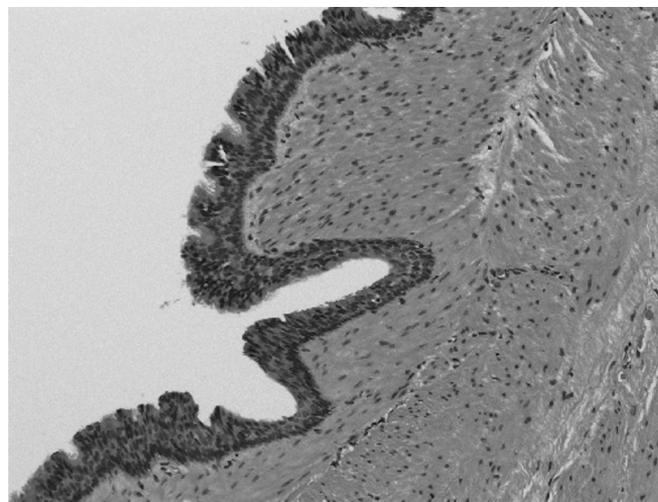


**Figure 1.** T<sub>2</sub>-weighted magnetic resonance imaging revealed a 10-cm monocular pelvic cyst.



**Figure 2.** A large mesenteric cyst was located 5 cm from the end of the ileum.

the patient was noted to have a large mesenteric cyst located 5 cm from the end of the ileum (**Figure 2**) with grossly normal-appearing ovaries bilaterally. We initially attempted to perform laparoscopic resection of the cyst. However, a dense adhesion between the cyst and the ileal serosa was observed. Therefore, we decided to convert to HALS. An extra small wound retractor (Alexis, Applied Medical, Rancho Santa Margarita, California) was inserted into the umbilicus. A sterilized surgical glove was tightly attached to the cyst using quick-drying glue (Aron Alpha A, Sankyo, Tokyo, Japan) with careful attention not to spread it into the abdominal cavity. The cyst was punctured with a suction tube, and the cyst fluid was aspirated. After mobilizing the ileum and pulling it out of the ab-



**Figure 3.** The cyst was lined by respiratory-type ciliated epithelium (hematoxylin and eosin stain, 100×).

dominal cavity through the wound retractor, we performed partial resection of the ileum containing the cyst with functional end-to-end anastomosis while tightly clamping the punctured site to prevent spillage of cyst fluid remaining in the tumor. The total operative time was 183 minutes and the estimated intraoperative blood loss was <50 mL. The pathologic diagnosis was mesenteric monodermal teratoma. The cyst wall was composed of respiratory-type ciliated epithelial cells (**Figure 3**). The patient was uneventfully discharged on postoperative day 9. She was found to be doing well during the postoperative follow-up period.

## DISCUSSION

Mesenteric cysts are rare pathologic entities, with a reported incidence of approximately 1 of 27 000 to 1 of 100 000 admissions.<sup>1</sup> They can occur in any segment of the mesentery, from the duodenum to the rectum. Fifty percent of mesenteric cysts are found in the small-bowel mesentery, half of which are found were in the ileal mesentery.<sup>2</sup> Mesenteric cysts can be found at any age, including childhood and adulthood, and even during pregnancy.<sup>3</sup> According to a review of the literature regarding mesenteric cysts conducted by de Perrot et al,<sup>4</sup> children typically present with acute abdominal symptoms that may simulate appendicitis, while adults tend to have more indolent symptoms. The symptoms are variable, nonspecific, and include pain (82%), nausea and vomiting (45%), constipation (27%), and diarrhea (6%). Abdominal masses may be palpable in up to 61% of patients. Mesen-

teric cysts can be divided into 6 groups based on their clinical and histopathological features: (1) lymphatic, (2) mesothelial, (3) enteric, (4) urogenital, (5) germ cell, and (6) nonpancreatic.<sup>4</sup> Malignant forms of mesenteric cysts have been described previously,<sup>5,6</sup> and the incidence of malignancy is reported to be less than 3%.<sup>2</sup> To exclude malignant potential, performing complete surgical excision and a full histological examination of the resected specimen are recommended.

Mature cystic teratomas are commonly found in the ovaries. English-language articles on PubMed published by October 31, 2012, were searched using the key words or combinations of the key words “mature cystic teratoma,” “mesenteric teratoma,” “mesenteric cyst,” and “dermoid cyst” for all articles related to mesenteric teratomas. Only 21 cases of mesenteric teratoma have been previously reported.<sup>7–26</sup> Of these 21 cases, we were able to obtain detailed information for 18 patients, as shown in **Table 1**. Mesenteric teratomas can occur at any age, from newborns to adult patients, the same tendency as that observed in the previously reported literature regarding mesenteric cysts. The tumor size is approximately 10 cm in most cases, indicating that mesenteric teratomas are undetectable unless they grow to a considerable size and cause the patient to present with various symptoms. However, even if the patient presents with abdominal complaints, it is often difficult to make a diagnosis of mesenteric teratoma in the preoperative period. Though computed tomography and magnetic resonance imaging examination are available, only 4 of the 21 patients (19%) with mesenteric teratomas were diagnosed before undergoing surgery.<sup>14,19–21</sup> The preoperative diagnoses in these patients include other common abdominal masses such as mesenteric teratomas misdiagnosed as ovarian cysts in 3 cases<sup>7,22,26</sup> and as a parasitic cyst in 1 case.<sup>24</sup> Two of the 21 patients (9.5%) were diagnosed with immature teratomas.<sup>14,22</sup> This is a higher incidence of malignancy than that observed with mesenteric cysts (3%). Therefore, physicians should recognize the importance of possible malignancy when preoperative diagnostic imaging reveals fat-containing abdominal tumors. Complete surgical excision is the only method to distinguish mesenteric benign teratomas from other diagnostic possibilities.

Mature cystic teratomas are usually composed of well-differentiated derivations from at least 2 of the 3 germ cell layers (ectoderm, mesoderm, and endoderm). In contrast, some rare cases of teratomas composed of mature tissue originating from only 1 germ cell layer have been previously described.<sup>27,28</sup> Such neoplasms are categorized as “monodermal teratomas.”

Mesenteric cysts can be treated with either laparotomy or laparoscopic surgery. The selection of the surgical approach depends on the size of the cyst, the location within the abdominal cavity, and the skill of the surgeon. Mackenzie et al<sup>29</sup> first reported a case of a mesenteric cyst treated with laparoscopic surgery in 1993. Although laparoscopic surgery for mesenteric cysts has gained popularity, only 1 case of mesenteric teratomas treated with conventional laparoscopic surgery has been described.<sup>23</sup> To the best of our knowledge, this is the first case of a mesenteric teratoma treated with HALS reported in the English literature.

The fear of malignancy may be the main reason that the previously reported cases almost chose laparotomy over laparoscopic surgery. A major concern in laparoscopic surgery for large cystic tumor is the higher possibility of intraoperative spillage of potentially malignant fluid in the cyst. To overcome the problem, several novel techniques combined intracorporeal and extracorporeal procedures have been described.<sup>30–32</sup> From Japan, Takeda et al<sup>30</sup> and Kumakiri et al<sup>31</sup> have introduced the utility of a double-balloon catheter (SAND Balloon, Hakko Medical, Tokyo, Japan) in gynecologic surgery. Watanabe et al<sup>32</sup> has described another novel method with a sterilized surgical sheet attached to the cyst using quick-drying glue, which is very similar to our method using a surgical glove.

In our case, due to the presence of a dense adhesion between the cyst and the ileal serosa and the risk of rupture of the cyst in the abdominal cavity, we performed hand-assisted laparoscopic partial resection of the ileum. According to a systematic review regarding HALS in colorectal surgery,<sup>33</sup> it has the advantages of laparoscopic surgery over laparotomy while reducing some of the disadvantages of laparoscopic surgery (shorter operative time and lower conversion rates). Especially for indications in which an incision to extract the resected specimen is required, HALS is considered to be an excellent treatment option. Our experience shows that avoiding the use of extra incisions is a significant advantage of HALS.

## CONCLUSIONS

We herein reported a rare case of a mesenteric monodermal teratoma mimicking an ovarian tumor. Surgeons should recognize the difficulty in correctly diagnosing a pelvic mass preoperatively or intraoperatively without the help of frozen section analysis or permanent pathological evaluation.

**Table 1.**  
Patients' Characteristics

Reference No.	Reported Year	Age	Sex	Tumor Size (cm)	Symptom	Preoperative Diagnosis	Type of Surgery Performed	Pathologic Diagnosis
7	1959	26 y	F	14 × 8	Abdominal pain, nausea	Ovarian torsion, tubo-ovarian abscess	Laparotomy	Mature cystic teratoma
10	1984	13 y	M	15.5 × 17	Abdominal pain	—	Laparotomy	Mature cystic teratoma
11	1989	5 y	F	10 × 8	Nontender abdominal mass	—	Laparotomy	Cystic teratoma
12	1993	10 y	F	—	—	—	—	Benign cystic teratoma
13	1995	8 mo	F	5.5 × 4.5 × 4.5	Intractable diarrhea	—	Laparotomy	Mature teratoma
14	1997	Newborn	M	6 × 5 × 5	—	Mesenteric teratoma	Laparotomy	Immature teratoma
15	2001	28 y	F	6.5	Abdominal pain, nausea, vomiting, dysuria	Cecal volvulus	Laparotomy	Mature cystic teratoma
16	2002	2 y	M	15 × 18	Nonbilious vomiting	Intestinal obstruction	Laparotomy	Benign cystic teratoma
18	2003	5 mo	F	—	—	—	—	Mature teratoma
		4 mo	M	—	—	—	—	Mature teratoma
19	2003	68 y	M	18 × 10 × 6	None	Mesenteric epidermoid cyst	Laparotomy	Epidermoid cyst
20	2004	30 y	M	4	Acute abdominal pain	Mesenteric teratoma	Laparotomy	Mature cystic teratoma
21	2006	9 y	F	3 masses (each 3 cm)	Abdominal pain, vomiting	Multiple mesenteric teratoma	Laparotomy	Mature cystic teratoma
22	2007	7 y	F	15 × 15	Abdominal pain, bilious vomiting, constipation	Ovarian mass	Laparotomy	Immature teratoma
23	2010	23 y	F	3.9 × 5.5 × 7.3	Nontender abdominal mass	Mesenteric cyst	Laparoscopy	Mature cystic teratoma
24	2011	2 y	F	10 × 5	Nontender abdominal mass	Parasitic cyst	Laparotomy	Mature cystic teratoma
25	2011	19 y	M	10 × 9 × 8	Abdominal pain, vomiting	Mesenteric cyst	Laparotomy	Mature cystic teratoma
26	2011	60 y	F	9 × 8 × 8	Abdominal pain	Ovarian mass	Laparotomy	Mature cystic teratoma

F, female; M, male.

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